14.0 Rifle, Colorado, Disposal Site

14.1 Compliance Summary

The Rifle Disposal Site was inspected on August 9, 2006, and was in good condition. The entrance sign was replaced. Debris washed onto the access road from runoff was removed. Repairs made in 2005 to the upper interceptor trench remain effective. Pore water continued to be removed from the disposal cell and pumped to an evaporation pond; the Long Term Surveillance Plan (LTSP) pore water elevation action level was not exceeded. Surveys performed in November 2005 determined that the standpipes on the disposal cell were tilted slightly down slope (5% maximum) and that the settlement plates on the disposal cell showed no lateral or down slope movement, but did have a slightly lower elevations (0.46 ft maximum). Annual resurveying of these features will be performed for several years to ensure that no disposal cell movement down slope is occurring. Several tamarisk plants located on site were cut and treated with herbicide. Following reseeding in 2005, a mixture of weeds and desirable perennial species continues to cover the revegetated 16-acre right-of-way area on Bureau of Land Management (BLM) land south of the site. There was no requirement for a follow-up or contingency inspection.

14.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Rifle, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Estes Gulch Disposal Site near Rifle, Colorado* (DOE/AL/62350–235, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, November 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 14–1.

Table 14–1. License Requirements for the Rifle, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 14.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 14.3.2
Routine Maintenance and Repairs	Section 4.0	Section 14.3.3
Ground Water Monitoring	Section 2.6 and Appendix	Section 14.3.4
Corrective Action	Section 5.0	Section 14.3.5

Institutional Controls—The 205-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) in 1998. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, access control fencing, warning/no trespassing signs placed along the disposal cell boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

14.3 Compliance Review

14.3.1 Annual Inspection and Report

The site, located five miles north of Rifle, Colorado, was inspected on August 9, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 14–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

14.3.1.1 Specific Site Surveillance Features

Access Road, Gates, Fence, and Signs—The site is accessed from a gravel road off of State Highway 13; the gravel access road is approximately a mile long and in good condition. In 2006,
14A debris washed on to the access road from a heavy precipitation event was removed. A perpetual right of way across BLM property provides access to the site. Two gates are installed on the access road. The first gate, installed along the access road where it passes through a narrow road cut, limits site intrusion and helps prevent vandalism to the cell dewatering system. The second gate is the site entrance gate; it consists of a pair of tubular metal gates hinged to galvanized steel posts installed in the barbed-wire stock fence south of the disposal cell and evaporation pond. A chain and padlock secures both gates. The gates were both locked and in excellent condition.

The barbed-wire stock fence, which extends to the edge of steep-sided arroyos that bound the site on the east and west sides, continues to prevent cattle from entering and grazing near the cell. Minor repairs are needed along the fence, but it continues to remain functional. There was evidence of wildlife (elk and deer) crossing the fence and grazing in the revegetated areas adjacent to the disposal cell.

The entrance sign, again found missing at the time of the inspection, was replaced. Perimeter
14B sign P9, that was located directly east of the entrance sign and found missing in 2005, will not be replaced. Two other perimeter signs have bullet damage but remain legible. The remaining perimeter signs were in excellent condition.

Markers and Monuments—Two granite site markers, one just inside and left of the entrance gate and the other on the disposal cell, were undisturbed and in good condition (PL–1).

There are three survey monuments and 15 boundary monuments at this site. Boundary monuments are set at corners along an irregular site boundary. The site boundary has 20 corners; however, monuments were not set at 5 of the corners because of the rough terrain. Consequently, boundary monument locations BM–8, BM–9, BM–13, BM–17, and BM–20 were only marked with wooden lath, and are not included as part of the annual inspection. Many of the survey and boundary monuments at this site are difficult to locate because trees, brush, and rough terrain obscure them. All survey and boundary monuments inspected were found to be in good condition.

Standpipes—Three standpipes, MW–01, MW–02, and MW–03, are located on the south sideslope of the disposal cell and in good condition. Dataloggers with remote data transfer systems (i.e.; telemetry) are installed in MW–02 and MW–03 to measure water level

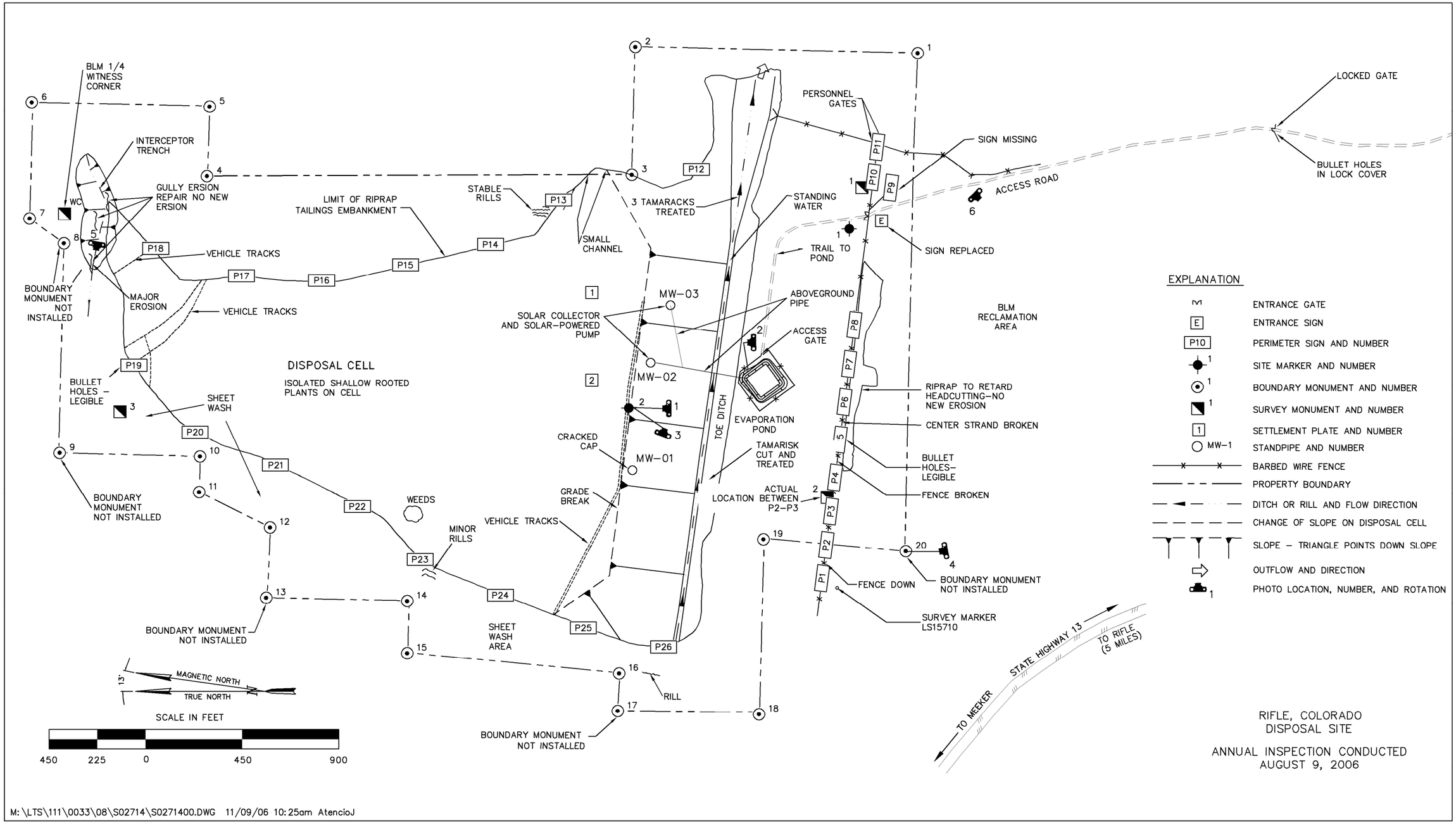

Figure 14–1. 2006 Annual Compliance Drawing for the Rifle, Colorado, Disposal Site

fluctuations. Information from this instrumentation is transmitted via cellular telephone technology to an internet connection where the data can be retrieved. These two standpipes have solar-powered pumps (PL–2) that discharge water through small-diameter aboveground plastic pipelines to a lined evaporation pond. The solar collectors are designed to automatically follow the position of the sun for optimal performance. There is no datalogger or pump in MW–01 because it is too shallow and usually dry. Water level data collected from these two standpipes are presented below in Section 14.3.4.

Evaporation Pond—An evaporation pond was constructed in 2001 to receive water pumped from standpipes MW–02 and MW–03. A datalogger, also with a remote data transfer system, is installed in the evaporation pond to measure water level fluctuations. The lined pond, surrounding security fence, and locked fence gate were in excellent condition (PL–3).

14.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the top of the disposal cell and interceptor trench; (2) the toe ditch and toe ditch outlet; (3) reclaimed areas; and (4) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Disposal Cell and Interceptor Trench—Rock armor covering the 71-acre disposal cell was in excellent condition (PL–4). No evidence of subsidence, differential settlement, or slumping was found.

In November 2005, due to an apparent slight inclination of the standpipes that suggested possible movement of the cell, the eight settlement plates were resurveyed (previously surveyed in 1997), along with the standpipes. Results of this survey indicated that the stickup sections of the standpipes (about 36 inches) were inclined up to 5 degrees down slope. No record of the original inclination of the standpipes can be found in site records, and it is presumed that the standpipes were vertical when installed. Neither the standpipes nor the settlement plates were found to display any lateral movement since they were installed in 1996; however, a minor drop in the elevation of the settlement plates (up to 0.46 ft) was reported, indicating settlement may have occurred. This amount of settlement is not unexpected considering that a significant amount of wet tailings were placed in the disposal cell and removal of pore water from the cell has occurred since construction. The reported lack of lateral movement suggests that the pile has not moved over the past 10 years. Survey of these features will be continued annually for the next several years.

A revegetated interceptor trench was constructed at the top of the disposal cell to protect the cell from storm-water and snowmelt run-on. The trench diverts water to the arroyo west of the site. Significant erosion occurred during a major rain event in 2005 and repairs to the interceptor trench were considered necessary. Rocks were moved into the eroded channel and the erosion stabilized in November 2005. The area had no new erosion at the time of the 2006 inspection (PL–5). Monitoring of this trench will continue.

Treatment of noxious weeds on the south slope of the interceptor trench in 2004 remains effective. Noxious weeds were not found in 2005 or 2006.

Toe Ditch and Toe Ditch Outlet—A toe ditch runs along the downslope (south) edge of the disposal cell and is armored with the same rock that protects the disposal cell. The toe ditch diverts surface runoff from the disposal cell off-site to the east. Several tamarisk plants were found in the toe ditch and were cut and treated, along with a small area of Canada thistle found during the 2005 inspection. Plant encroachment is sparse and is not impairing the function of the toe ditch.

14C

Minor erosion, anticipated in the design, has occurred in the channel at the outlet below the toe ditch. Bedrock is now exposed at the outlet and rock placed at the bottom of toe ditch outlet is dropping into the eroding channel to protect it from further erosion. Comparison with a photograph taken at the same location during the 2003 inspection indicates that no new erosion had occurred. Monitoring of this area will continue.

Reclaimed Areas—Disturbed areas around the edges and south of the disposal cell were reseeded in 1996. The vegetation, primarily grasses, continues to be stressed due to several years of drought conditions; precipitation increases in both 2005 and 2006 is anticipated to improve conditions. There was no evidence of cattle grazing within the site boundaries during the past year.

Three arroyos are present in the reclaimed area south of the disposal cell. A rock apron was placed between the stock fence and the head-cuts in these arroyos to prevent headward migration toward the disposal cell. As erosion has migrated into the rock apron, the rock has dropped into the arroyos and effectively armored them from further erosion (self-armoring).

Rills noted during previous inspections in the vicinity of perimeter sign P13 were stable. However, the runoff collected by the rills flows along the interface between the riprap and the adjacent reclaimed soil area. The runoff has scoured a small channel that currently averages about one foot wide and less than one foot deep and has exposed some of the gravel bedding material. When compared with photos taken in recent years at this location, the channel was unchanged. This feature is not threatening the integrity of the disposal cell at this time; however, continued observation during subsequent site inspections is warranted.

The reclaimed area south of the disposal cell was disturbed by the construction of the evaporation pond. This area will be reclaimed again after the evaporation pond is decommissioned.

Outlying Area—The area beyond the site for a distance of 0.25 mile was visually inspected for signs of erosion, development, or other disturbance. The primary land use in the area is grazing and wildlife habitat. No activity or development was observed that might affect site integrity or the long-term performance of the disposal cell.

The revegetated area directly south of the disposal cell on BLM-managed land was inspected. During construction of the cell, DOE was granted a Right-of-Way Reservation Permit by the BLM to use this area for topsoil storage and other purposes. This area was seeded at the same

time as the disturbed areas adjacent to the cell on DOE-owned land. Approximately 16 acres of the area did not successfully revegetate and, late in 1999, BLM requested that DOE reseed this portion of the site. DOE disked and reseeded the 16 acres in October 2000. Due to drought conditions, and competition by cheatgrass, desirable plant species never became established, and the cheatgrass dominated plant cover between 2001 and 2004. In spring 2004, DOE sprayed the undesirable plants (cheat grass) that dominated the reseeded area. At the time of the 2004 inspection, the coverage of these plants was greatly diminished, but the continued drought had not allowed desirable vegetation to reestablish.

In 2005, a major effort was expended to reestablish desirable plants on the 16-acre area. The area was plowed and reseeded. Reclamation specialists visited the site in spring 2006 and noted that many of the desirable seeded species had germinated and that cover by cheatgrass had decreased dramatically. Following a dry hot summer, many of the desirable species that germinated did not survive which allowed annual weeds to take over the site. At the time of the 2006 inspection, annual weeds dominated plant cover throughout the 16-acre area (PL–6). The annual weed cover may provide shade and allow desirable perennial species to reestablish. No corrective action is recommended at this time and inspectors will continue to monitor plant composition in the area.

14.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

14.3.3 Routine Maintenance and Repairs

In 2006, DOE removed debris deposited on the access road, replaced the entrance sign, and cut and treated tamarisk plants on site.

14.3.4 Ground Water Quality Monitoring

Monitoring of ground water quality is not required at this site because ground water in the uppermost aquifer is of limited use and the disposal cell is geologically isolated from the first useable aquifer by approximately 3,800 feet of low-permeability siltstones, shales, and sandstones.

14.3.5 Disposal Cell Pore Water Level Monitoring

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DOE monitors pore water levels in the disposal cell at standpipes MW−02 and MW−03 installed at the down gradient end of the cell on the south side slope to ensure that water within the disposal cell does not rise above the design protection feature, which would occur at an elevation of 6,020 feet. Wet tailings were included with the materials disposed within the cell. Tailings material at the toe of the disposal cell was constructed against a berm or earthen embankment at the southern (downslope) end of the cell. Because of concern that transient drainage and surface infiltration might cause a surface expression (i.e.; seep) to develop, a liner was installed that

extends part way up on the inside of the embankment to an elevation of 6,020 feet. If water within the disposal cell were to rise above this elevation, it would overflow the liner and saturate the embankment. This condition could weaken the down slope end of the cell sufficiently to allow slumping to occur, and also could cause a contaminated seep to emerge on the south slope of the cell. Therefore, water level monitoring is performed and an action level for pumping when pore water levels reached an elevation of 6,016 feet was established in the LTSP.

As specified in the LTSP, when the water level in MW–02 and MW–03 first approached the action level for pumping, DOE initiated a procedure to lower the water level in the cell. Water levels were first observed to have slightly exceeded the action level in September 2000 recording an elevation of 6016.03 feet in MW–02 and 6016.27 feet in MW–03. An evaporation pond for this purpose was constructed in 2001 and a solar-powered pump was installed in MW–02 with a small-diameter aboveground plastic pipeline delivering water to the evaporation pond. Although water was being removed from the toe of the disposal cell, the rate of removal was not enough to lower the water level in the cell, as indicated by the water level having not decreased by the end of 2003. During this same time period the production (volume of water being extracted) from MW–02 had begun to decrease for unknown reasons. Fluctuations above and below the action level occurred between September 2000 and May 2003 with levels in excess of the action level reaching a maximum in March 2003 recording an elevation of 6,016.61 feet in MW–02 and 6,016.66 feet in MW–03. In December 2003, a solar-powered pump (similar to the one in MW–02) was installed in MW–03 and a plastic above-ground water line was plumbed into the existing water line to increase the amount of water being removed from the disposal cell and sent to the evaporation pond.

At the time of the 2004 inspection, the pump in MW–02 had been operating at about 1 gallon per minute (gpm) and the pump in MW–03 at about 4 gpm. In 2005 and 2006, at the time of the inspection, MW–02 was operating intermittently and producing little water, and MW–03 was producing an estimated 2 to 3 gpm. The solar collector for MW–03 was tracking the position of the sun for optimal performance, but the panel for MW–02 was not tracking as closely; still both appeared to be operational and in good condition. The small-diameter plastic surface water line to the evaporation pond was also in good condition. Cell dewatering continues with evaporation rates in the evaporation pond having kept up with the influent rates. Heavy precipitation in October 2006 caused some concern that the pumps would have to be shut off in order to avoid overtopping of the pond from occurring, but the remote monitoring showed the water level remained below the design capacity of the pond and the pumps were not shut off.

14E

As shown by datalogger measurements (Figure 14–2), over the past year during pumping water levels initially decreased sharply followed by a steadier continuous decline, only rising in correspondence to precipitation events. The water level elevation remained below 6,015 feet in both standpipes. Datalogger malfunction in MW–02 resulted in lost water level data from late August through late October (when the pumps were shut off); because water levels in this well historically have remained significantly below the action level, and also below the water levels recorded in MW–03, there was no concern that the action level had been exceeded. In support of this conclusion, the static water level measurements obtained in both standpipes MW–02 and MW–03 when the pumps were shut off on October 30, 2006, were below the action level. During this period of pumping (early June to late October), fluctuations in the water levels represent typical drawdown and recovery that occurs during pumping on/off cycles. The pumps were shut

off for the winter because of reduced evaporation rates and the threat of breakage from freezing of the surface waterlines.

Looking back to early November 2005 when the pumps were turned off for the winter, water levels increased to 6015 feet within a relatively short time and then very slowly increased over the winter toward the action level of 6016 feet. The water levels did not reach the action level before pumping was resumed in early June 2006.

To date, approximately 3.8 million gallons of water have been pumped from the disposal cell. This includes the volume pumped during construction of the disposal cell and the volume pumped since dewatering was initiated again in 2001. The rapid recovery of the water levels in the standpipes to approximately 6,015 feet after pumping is discontinued, and the slow recovery afterward toward the 6,016-foot action level over the next six months, suggests a large reservoir of water remaining in the disposal cell.

DOE intends to remove enough water from the disposal cell to lower water levels in the standpipes to below the 6,014-foot elevation. At that time, pumping will be stopped, and water levels will be monitored to ensure they remain at or below that elevation. If water levels again rise, pumping will resume.

14.3.6 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

The LTSP establishes that corrective action will be taken if the water level in the disposal cell reaches 6,016 feet in elevation. Corrective action was initiated late in 2001 with the installation of the evaporation pond and dewatering of the cell. This action has lowered the water level to an acceptable elevation and prevents water from overtopping the disposal cell liner. Dewatering of the cell continued in 2006 and will continue in 2007.

14.3.7 Photographs

Table 14–2. Photographs Taken at the Rifle, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	NA	Site marker #1 on top of the disposal cell.
PL–2	360	Standpipe MW–02 and associated solar collector for solar powered submersible pump.
PL–3	160	Evaporation pond directly south of the disposal cell.
PL–4	350	Disposal cell.
PL–5	280	Erosion control in interceptor trench completed fall 2005, no new erosion.
PL–6	225	BLM Right of Way Reservation area south of disposal cell; plowed and reseeded in 2005.

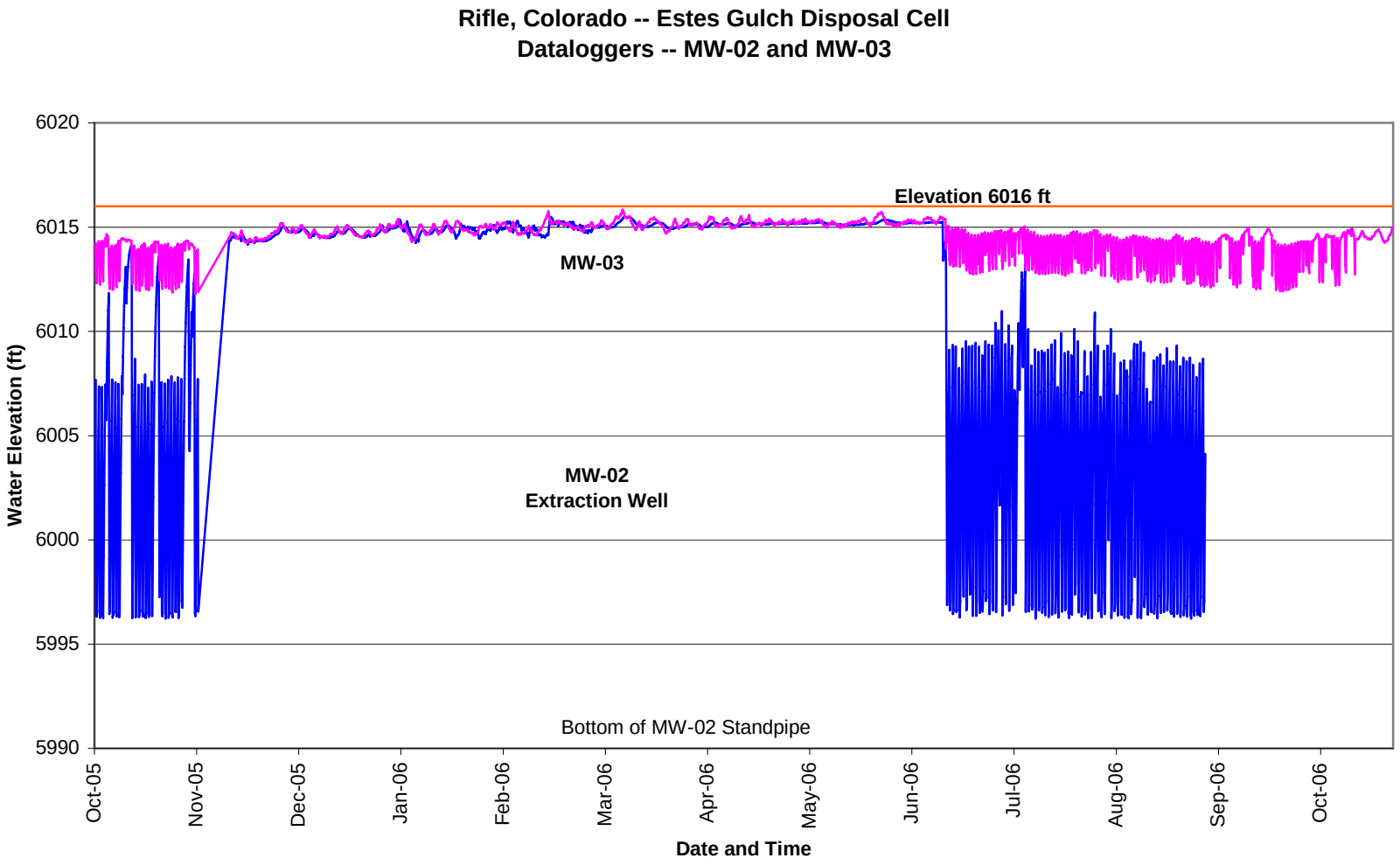
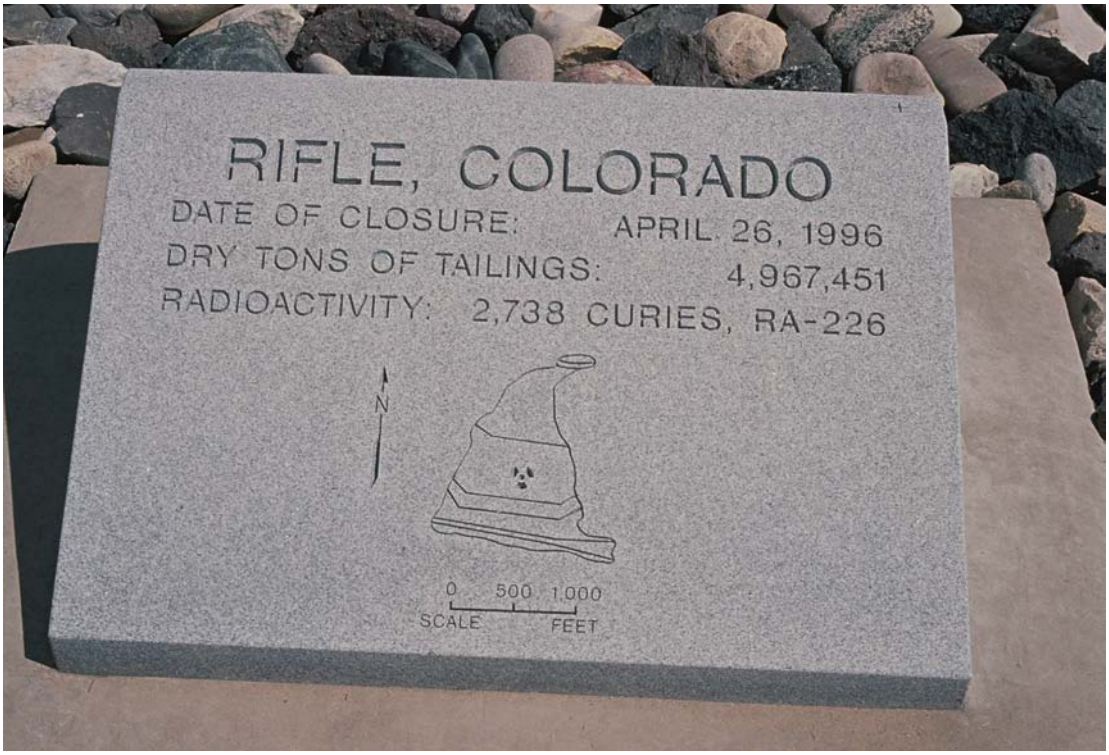


Figure 14−2. Disposal Cell Pore Water Levels in Standpipes MW−02 and MW−03 at the Rifle, Colorado, Disposal Site.



RFL 8/2006. PL–1. Site marker #1 on top of the disposal cell.

RFL 8/2006. PL–2. Standpipe MW–02 and associated solar collector for solar powered submersible pump.

RFL 8/2006. PL–3. Evaporation pond directly south of the disposal cell.

RFL 8/2006. PL–4.Disposal cell.

RFL 8/2006. PL–5. Erosion control in interceptor trench completed fall 2005, no new erosion.

RFL 8/2006. PL–6. BLM Right of Way Reservation area south of disposal cell; plowed and reseeded in 2005.

End of current section